

REMARKS**Amendments to the Claims**

Claims 85-113 have been canceled.

New Claims 114-141 have been added. Support for these claims can be found throughout the specification, for example, as indicated in the table below.

| Claim No. | Support in the Specification |
|---------------------|---|
| 114 | page 3, lines 25-26; page 4, lines 8-10 |
| 115 | page 4, lines 10-11 |
| 116-117 | page 4, lines 13-15; page 28, lines 15-23 |
| 118 and 133 | page 16, lines 1-3 |
| 119-120 and 134-135 | page 2, lines 25-27; page 3, lines 1-3 |
| 121 | page 5, lines 10-12 |
| 122 and 136 | page 9, lines 6-8 |
| 123-125 and 137-139 | page 9, lines 12-15 |
| 126 and 140 | page 32, line 3 through page 33, line 28 |
| 127 and 141 | page 10, lines 18-21 |
| 128 | page 3, lines 17-24; page 26, lines 10-16; page 27, lines 22-25 |
| 129 | page 26, line 17 through page 27, line 4 |
| 130 | page 27, lines 19-21 |
| 131-132 | page 1, lines 15-21; and page 16, lines 4-17 |

Objection of Claim 104

Claim 104 was objected as being improper dependent form. Claim 104 has been canceled, thereby obviating the objection.

Rejection of Claims 85-113 under 35 U.S.C. § 103

Claims 85-113 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Autran *et al.* (U.S. Patent No. 6,838,037).

Claims 85-113 have been canceled, thereby obviating the rejection.

New Claims 114-141 have been added. These claims are novel and non-obvious over Autran *et al.* for the following reasons.

Applicant's Claimed Invention

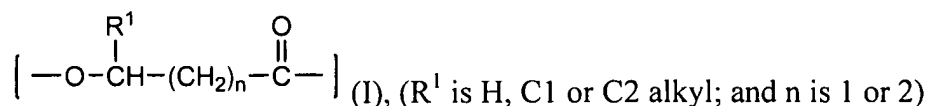
Applicant's claimed invention is directed to a PHA blend, an article comprising the PHA blend, and methods of making the PHA blend and the article, as set forth in the new Claims 114-151.

As set forth in new Claims 114-126, the PHA blends comprise a first PHA and a second PHA, wherein the first PHA is a copolymer having a comonomer 1-A and a comonomer 1-B and the second PHA is a copolymer having a comonomer 2-A and a comonomer 2-B. The first PHA copolymer and the second PHA copolymer can be the same copolymer, in which the ratio of comonomer 1-A : comonomer 1-B in the first PHA is different from the ratio of comonomer 2-A : comonomer 2-B in the second PHA.

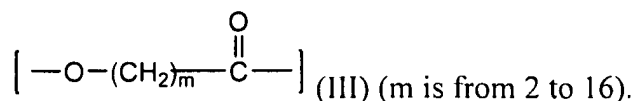
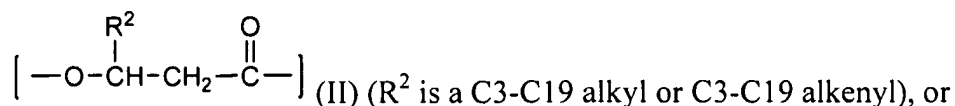
As set forth in new Claims 127-141, the PHA blends comprise a first PHA and a second PHA, wherein the first PHA is a poly(3-hydroxybutyrate) (PHB) homopolymer and the second PHA is a copolymer of 3-hydroxybutyrate and 4-hydroxybutyrate.

Teachings of Autran *et al.*

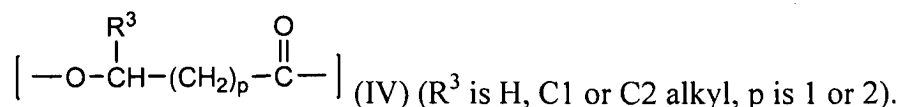
Autran *et al.* teaches a composition comprising at least two polymer components. The first component is a polyhydroxyalkanoate (PHA) copolymer, which comprises at least two comonomers, wherein the first comonomer is represented by the following structural formula:



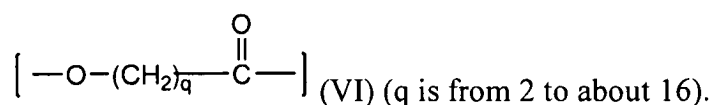
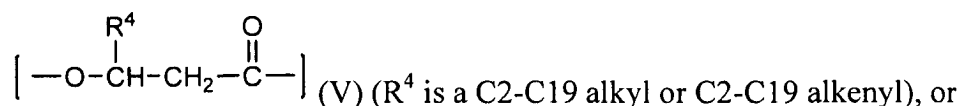
and the second comonomer is represented by structures (II) or (III):



The second component can be a PHA homopolymer or a PHA copolymer, which comprises at least one monomer unit represented by structure (IV):



The PHA polymer as the second component can further include two or more additional monomer units represented by structures (V) or (VI):



Applicant's claimed invention is novel over Autran et al.

There is no teaching in Autran *et al.* of a PHA blend comprising a first PHA copolymer having comonomers 1-A and 1-B and a second PHA copolymer having comonomers 2-A and 2-B, wherein the first PHA and the second PHA are the same polymer, in which the ratio of comonomer 1-A : comonomer 1-B in the first PHA is different from the ratio of comonomer 2-A:comonomer 2-B in the second PHA. Therefore, Applicant's claimed invention as set forth in new Claims 114-126 is novel over Autran *et al.*

Similarly, Autran *et al.* does not teach a PHA blend comprising a first PHA and a second PHA, wherein the first PHA is a poly(3-hydroxybutyrate) homopolymer and the second PHA is a copolymer having 3-hydroxybutyrate and 4-hydroxybutyrate as two comonomers. Therefore, Applicant's claimed invention as set forth in new Claims 127-141 is novel in view of Autran *et al.*

Applicant's claimed invention is non-obvious in view of Autran et al.

Section 2144.08 of the Manual of Patent Examination Procedure (MPEP) states:

The fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. *In re Barird*, 16 F.3d 380, 382, 29 USPQ2d 1941, 1943 (Fed. Cir. 1994) ("The fact that a claimed compound may be encompassed by a disclosed generic formula does not by

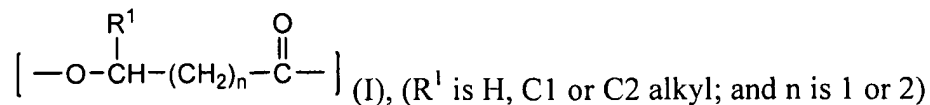
itself render that compound obvious.”); *In re Jones*, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992) (Federal Circuit has “decline[d] to extract from *Merck [& Co. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir. 1989)] the rule that ...regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it.”).

The MPEP further states in Section 2144.08, subsection 4 that to determine whether one of ordinary skill in the art would have been motivated to select the claimed species or subgenus, several factors need to be considered including, *inter alia*, the size of the genus, the express teachings of the prior reference, the teachings of any structural similarity and teachings of similar properties or uses.

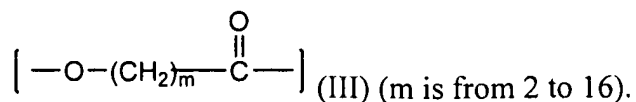
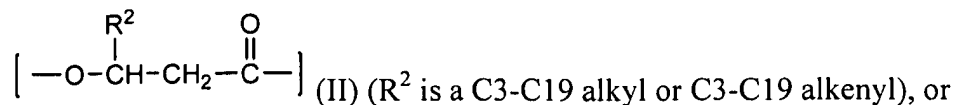
In rejecting previously pending Claims 85-113, the Examiner appears to be taking the position that the claimed subject matter is encompassed by the teachings of Autran *et al.* and is therefore obvious. The Examiner is respectfully reminded that rejection of a species or a subgenus over a prior disclosure of the genus would be improper without taking into consideration of the factors set out in MPEP section 2144.08, subsection 4, as described above. When considering these factors, it is clear that the claimed invention is non-obvious in view of Autran *et al.* for the following reasons.

1) The PHA compositions taught in Autran *et al.* encompass a large number of possible PHA blends.

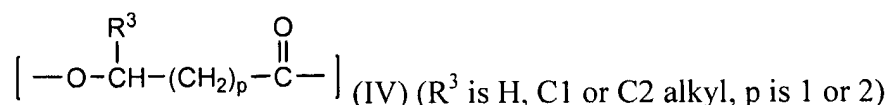
As discussed above, Autran *et al.* teaches PHA compositions comprising a PHA copolymer as the first component and a PHA homopolymer or a PHA copolymer as the second component. The first component PHA copolymer comprises at least two comonomers, wherein the first comonomer is represented by structure (I):



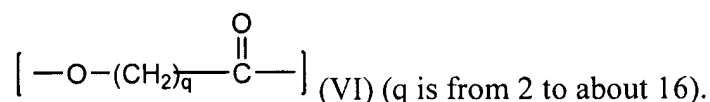
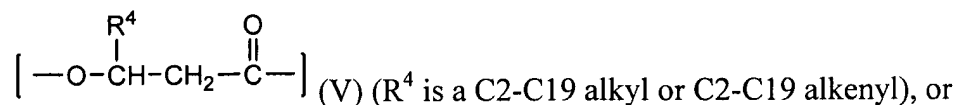
and the second comonomer is represented by structures (II) or (III):



Although there are only six possible structures for the first comonomer represented by structure (I), numerous possible structures are encompassed by structures (II) or (III) for the second comonomer. For example, R^2 can be a C3-C19 alkyl or a C3-C19 alkenyl in structure (II), which include a large number of possible groups, such as straight chained and every possible branched alkyl group with varying number of carbon atoms ranging from 3 to 19 as well as straight chained and branched alkenyl groups with 3 to 19 carbon atoms. In addition, there are 15 possible groups represented by structure (III) as m can be an integer from 2 to 16. Therefore, there are numerous possible structures for the second comonomer of the first PHA copolymer component. As such, when combined with six possible first comonomer structures, the number of possible polymers encompassed by the first PHA copolymer component taught in Autran *et al.* is even higher than numerous possible structures for the second comonomer represented by structures (II) or (III). The number of possible PHA polymers encompassed by the second PHA component is even higher than that for the first PHA component because the second PHA component can either be a homopolymer represented by structure (IV):



or a copolymer represented by structures (V) or (VI):



Similar to structures (II) and (III), structures (V) and (VI) also encompass various possible groups because R^4 of structure (IV) includes all possible straight-chain or branched alkyl or alkenyl group with 2 to 19 carbon atoms and q can be an integer from 2 to about 16. As a result, when combining all possible first PHA component with all possible second PHA component taught in Autran *et al.*, the resulting PHA compositions encompasses a huge number of possible PHA blends.

2) There is no express teaching in Autran *et al.* to motivate one of ordinary skill in the art to make and use Applicant's claimed PHA blends.

As discussed above, Autran *et al.* generally describe a PHA composition that encompassing a large number of possible PHA blends. In addition, Autran *et al.* teaches in a preferred embodiment that R^2 is a C3-C10 alkyl group; more preferably R^2 is a C3-C6 alkyl group; and even more preferably, R^2 is a C3 alkyl group. Furthermore, the only specific examples in Autran are limited to a PHA composition comprising a PHA copolymer of 3-hydroxybutyrate and 3-hydroxyhexanoate or a PHA copolymer of 3-hydroxybutyrate and 3-hydroxyoctanoate as the first PHA component and isotactic polyhydroxybutyrate (i-PHB) homopolymer as the second PHA component (see Examples 1-5).

The preferred embodiment and the specific examples taught in Autran *et al.* do not direct the skilled person to Applicant's claimed PHA blends. The preferred embodiment taught in Autran *et al.* does not encompass Applicant's claimed PHA blend, which comprise a 3-polyhydroxybutyrate (PHB) homopolymer and a 3-hydroxybutyrate-co-4-hydroxybutyrate (PHB4HB) copolymer because R^2 is -H for the 4-hydroxybutyrate comonomer in Applicant's claimed PHA blend; while R^2 is a C3-C10 alkyl, a C3-C6 alkyl or a C3 alkyl in the preferred embodiments in Autran *et al.* In addition, none of the specific examples in Autran *et al.* teaches Applicant's claimed PHA blend comprising a PHB homopolymer and a PHB4HB copolymer. Similarly, there is no express teaching in Autran *et al.* that directs the skilled person to a PHA blend of two PHA copolymers with the same comonomers but different comonomer ratios.

3) The PHA compositions taught in Autran *et al.* are structurally dissimilar from those claimed by Applicant.

As discussed above, the PHA composition exemplified by Autran *et al.* comprises a PHA copolymer of 3-hydroxybutyrate and 3-hydroxyhexanoate or a PHA copolymer of 3-hydroxybutyrate and 3-hydroxyoctanoate as the first PHA component and isotactic polyhydroxybutyrate (i-PHB) homopolymer as the second PHA component (see Examples 1-5). The PHA composition taught in Autran *et al.*, which comprises a PHA copolymer and a PHB homopolymer, is significantly different from Applicant's claimed PHA blends as set forth in Claims 114-126, which comprise two PHA copolymers. In addition, Applicant's claimed PHA blends as set forth in Claims 127-141 comprises a PHB homopolymer and a PHA copolymer

having 3-hydroxybutyrate and 4-hydroxybutyrate as two comonomer units. The PHA copolymer in Applicant's claimed PHA blends differs from the PHA copolymer component taught in Autran *et al.*, in which the second comonomer is 4-hydroxybutyrate in Applicant's PHA copolymer; while the copolymer of Autran *et al.* has 3-hydroxyhexanoate or 3-hydroxyoctanoate as the second comonomer unit. Although the comonomers only differ in 2 carbon unit (4-hydroxybutyrate vs. 3-hydroxyhexanoate) or 6 carbon units (4-hydroxybutyrate vs. 3-hydroxyoctanoate), the resulting polymers are not structurally similar and would have significant differences in their physical properties because the monomer units are repeated numerous times in the resulting polymers and any differences in the monomer units would be amplified. In addition, the 4-hydroxybutyrate comonomer unit in Applicant's PHA copolymer has four carbon units in the main polymer chain and none in the polymer side chain; while the comonomer units, namely 3-hydroxyhexanoate and 3-hydroxyoctanoate, taught in Autran *et al.* only have three carbon units in the main polymer chain and three or seven carbon units in the side chain, which may contribute to different physical properties in the resulting polymers. Therefore, the PHA compositions taught in Autran *et al.* are not similar in structure or property to Applicant's claimed PHA blends. As such, one of ordinary skill in the art would not be motivated to modify the PHA copolymer component in the PHA composition taught in Autran *et al.* to arrive at Applicant's claimed PHA blends, which includes a PHB homopolymer and a PHA copolymer of 3-hydroxybutyrate and 4-hydroxybutyrate.

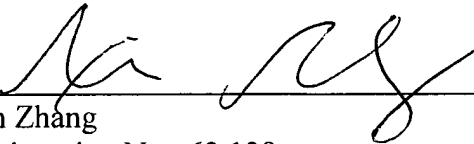
For the reasons discussed above, Applicant's claimed PHA blends, articles comprising the PHA blends, and methods of making the PHA blends and the articles, as set forth in Claims 114-141 are non-obvious in view of Autran *et al.*

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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